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# Three new *Deraiophorus* Canestrini, 1897 species from Thailand (Acari: Uropodina: Eutrachytidae)

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**Three new *Deraiophorus* Canestrini, 1897 species from Thailand (Acari: Uropodina: Eutrachytidae). -** Three new species of Uropodina mites from Thailand, *Deraiophorus mirabilis* sp. n., *Deraiophorus thailandicus* sp. n. and *Deraiophorus schwendingeri* sp. n., are described and illustrated.

**Keywords:** Mite - taxonomy - South-East Asia.

## INTRODUCTION

The genus *Deraiophorus* Canestrini, 1897 is one of the most species-rich genera of the Uropodina mites. More than 120 species are known from all tropical regions of the world (Wiśniewski & Hirschmann, 1993), but most *Deraiophorus* species can be found in the South-East Asian region (Wiśniewski, 1993; Kontschán, 2003). The Uropodina fauna of Thailand is completly unknown (Wiśniewski, 1993), till now nobody has mentioned such mites from this country. The Uropodina faunas of neighboring countries are better known (only one species is recorded from Myanmar, two species from Cambodia, three from Laos eight from Malaysia and 27 from Vietnam), but *Deraiophorus* species were only found in Vietnam (Wiśniewski, 1993).

## MATERIAL AND METHODS

Specimens were cleared in lactic acid and later stored in alcohol. Drawings were made with a camera lucida. All specimens examined are deposited in the collections of the Natural History Museum Geneva (Switzerland). Abbreviations: h1-h4, hypostomal setae, St1-St5, sternal setae. Measurements are given in micrometres (μm), width of idiosoma was taken at the level of the first lateral projections. The terminology of chelicerae follows Hirschmann (1990).

## DESCRIPTIONS

### *Deraiophorus* Canestrini, 1897

Diagnosis: Idiosoma subtriangular, with yellow-brown coloration. Marginal and dorsal shields fused in apical region. Postdorsal shield present, with one pair of pilose setae. Anterior margin of idiosoma bearing long, pilose setae placed on the

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margin or on the anterior horns. One, two or three pairs of lateral projections present, the whole margin bearing tree-like setae. Genital shield of female scutiform. Dorsal, ventral and genital shields ornamented with small oval pits. Tritosternum with narrow basis, tritosternal laciniae trifurcate, pilose or serrate. Hypostomal setae as follows: h1 long, smooth and wide, h2 and h3 shorter than h1, setiform and smooth or serrate, h4 antler-shaped. Corniculi horn-like, internal malae smooth. Basal part of epistome serrate, apical part with long hairs. First legs without claws, basitarsi of legs II-IV bearing serrate setae and smooth setae in apical part. Basal part of basitarsi with one pair of characteristic setae, these forked with four or five branches.

TYPE SPECIES: *Deraiophorus chyzeri* Canestrini, 1897 by original designation.

DISTRIBUTION: Tropical.

REMARKS: Hirschmann (1973) subdivided this genus into several species groups which six years later were formally named as genera (Hirschmann, 1979), i.e. *Deraiophorus* Canestrini, 1897; *Eutrachytes* Berlese, 1914; *Dentibaiulus* Schuster, 1962; *Loksaphorus* Hirschmann, 1979; *Mayaphorus* Hirschmann, 1979; *Dicornutophorus* Hirschmann, 1979; *Neobirophorus* Hirschmann, 1979; *Ceyloniphorus* Hirschmann, 1979; *Manuleatophorus* Hirschmann, 1979. Unfortunately later neither Hirschmann nor his co-workers (e.g. Hirschmann, 1993; Wiśniewski, 1993; Wiśniewski & Hirschmann, 1993) used these names and this system again.

In the present work I regard *Deraiophorus* as a genus in the family Eutrachytidae Trägardh, 1944 (= Deraiophoridae Trägardh, 1952). I do not discuss its subdivision by Hirschmann because that was only intended as an aid for identification of the species and does not reflect phylogenetic relationships. The three herein described species fit into Hirschmann's hexacornutus-species group based on the presences of three pairs of lateral projections and anterior horns (see Hirschmann, 1973).

It is my opinion that, after a thorough revision and phylogenetic analysis, *Deraiophorus* needs to be divided into several genera or subgenera.

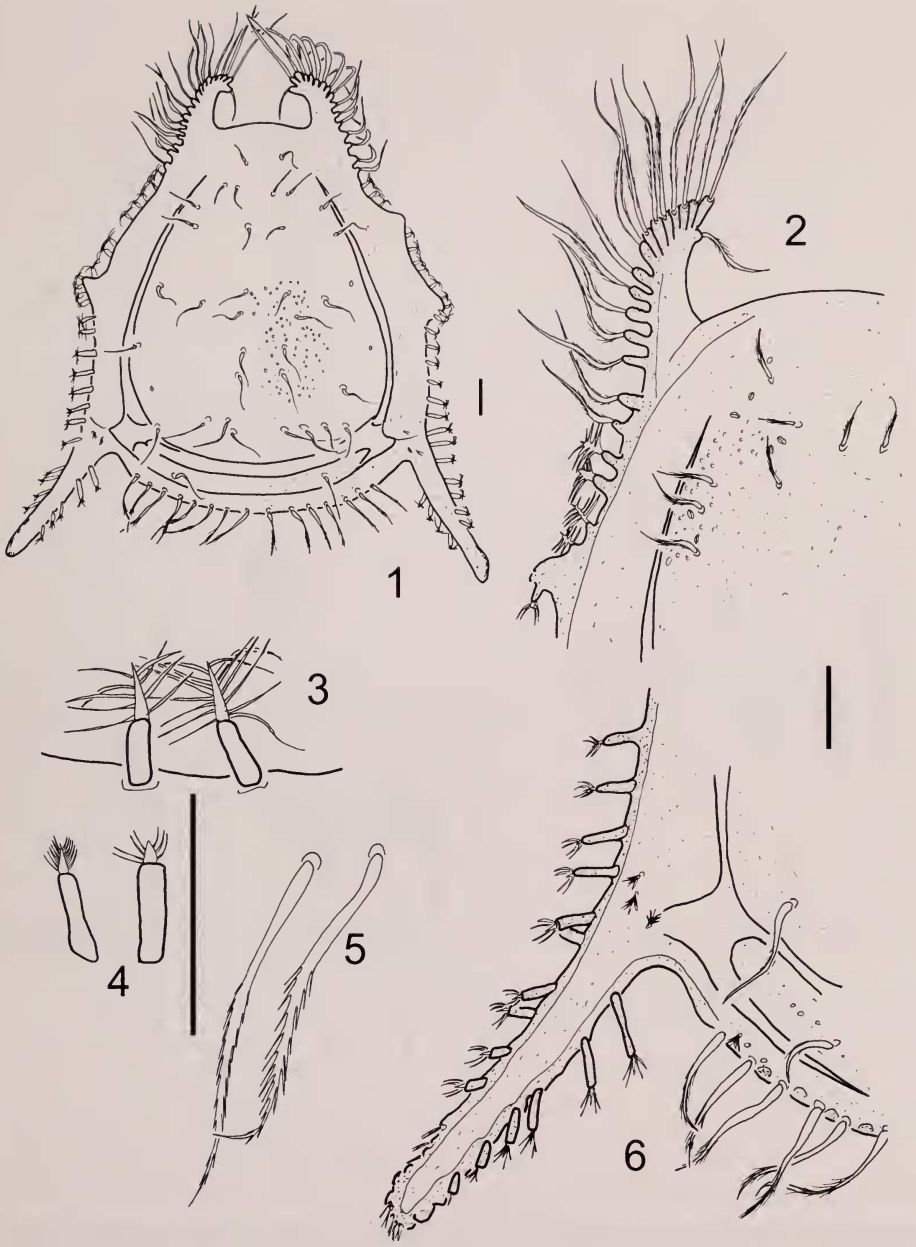
***Deraiophorus mirabilis*** sp. n. Figs 1-16

MATERIAL EXAMINED: Holotype, female, Thailand, Satun Prov., Thaleban National Park, in primary forest, 6°42'N, 100°07'E, 50 m, 1.-5.01.1998, leg. A. Schulz & K. Vock. – Paratypes, two females and one male, same data as for holotype.

DIAGNOSIS: Anterior horns well developed, bearing 16 long and medially pilose setae. Margins of idiosoma with three lateral projections, the third pair (in posterior region) very long (350-400 $\mu$m) and bearing tree-like setae. Dorsal shield with small alveolar ornamentation formed by several small oval pits on the genital shield and near the basis of coxae III and IV.

DESCRIPTION OF FEMALE: Length of idiosoma 950-1000 $\mu$m, width 710-780 $\mu$m (n=3). Shape subtriangular.

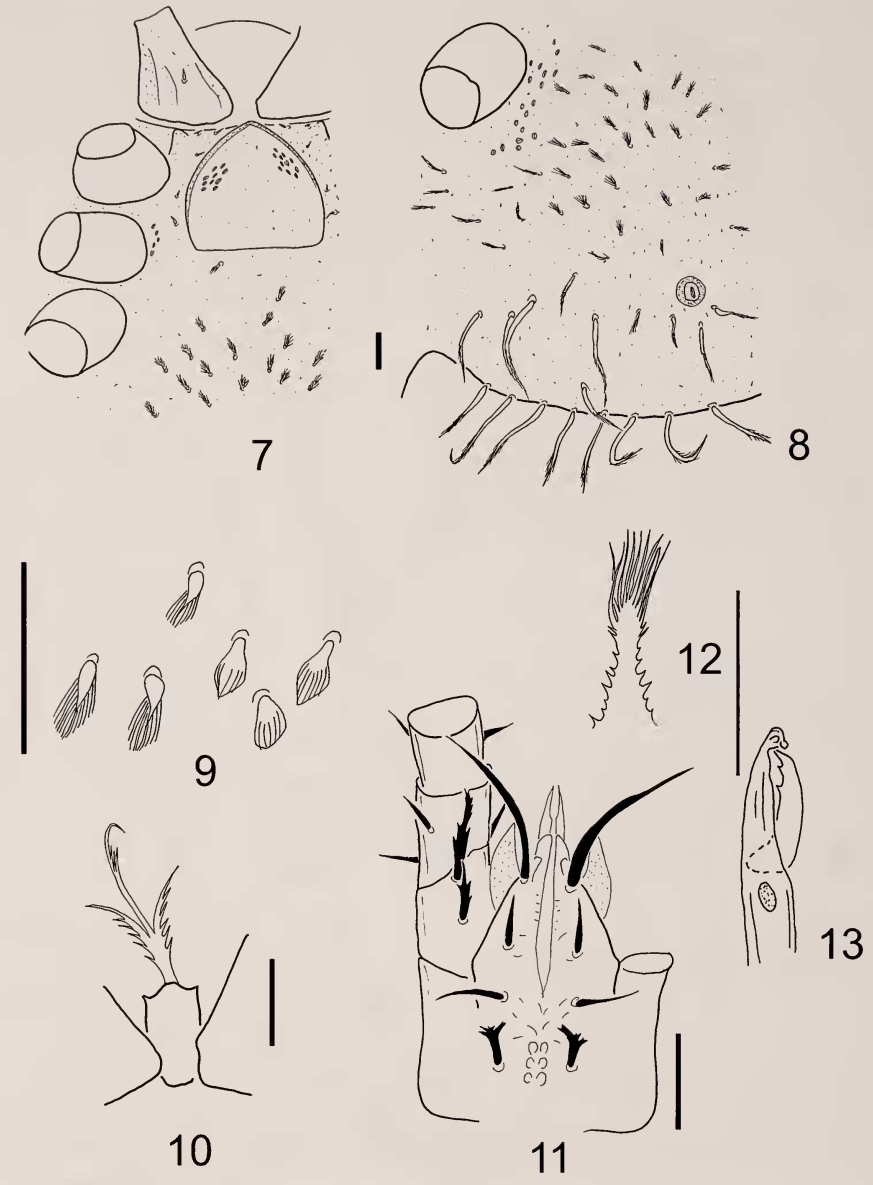
*Dorsal aspect of idiosoma* (Figs 1-6): Anterior horns well developed, with 16 long, medially pilose setae. Each seta placed on a wide basis (Fig. 2). Marginal setae tree-like, with longer (Fig. 4) or shorter (Fig. 5) branches. Posterior setae long, with serrate margin (Fig. 6). Dorsal and marginal shields fused anteriorly. Marginal shield without ornamentation, dorsal shield with a pattern formed by small alveoli. Several




FIGS 1-6

*Deraiophorus mirabilis* sp. n., holotype, female. (1) Body in dorsal view. (2) Anterior horn. (3, 4) Marginal setae. (5) Posterior setae. (6) Third (posterior) projection. Scale bars: 100 $\mu$m.

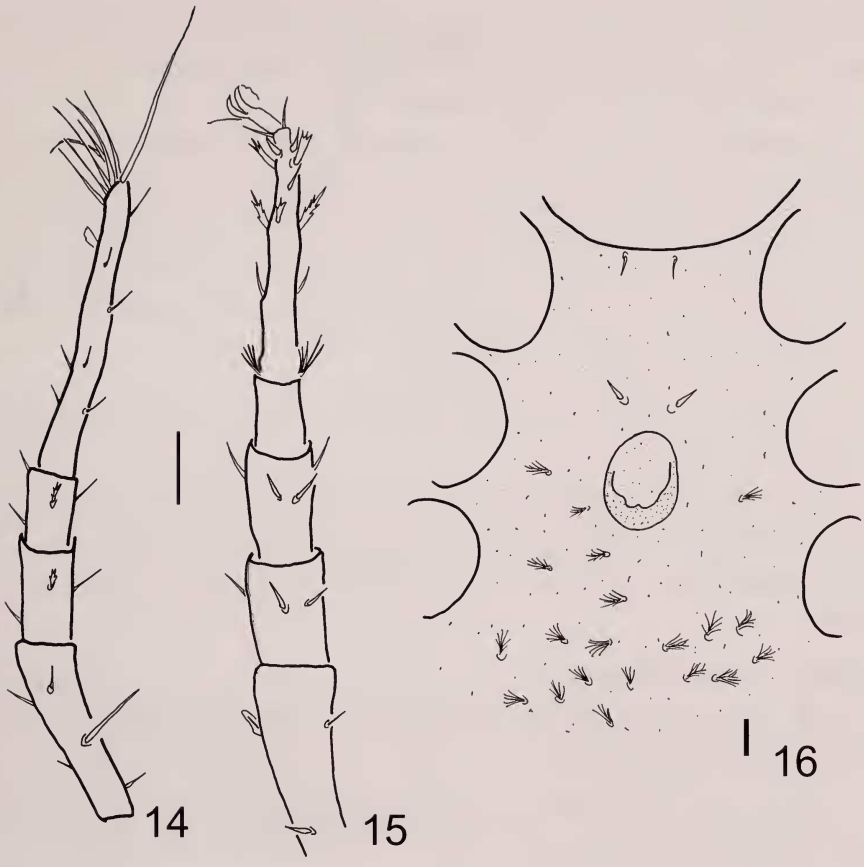
small oval pits visible in anterior region of dorsal shield. Dorsal setae one third as long as setae of the anterior horns but similar in shape. Several dorsal setae near posterior margin two or three times longer than other dorsal setae. Postdorsal shield present,




FIGS 7-13

*Deraiophorus mirabilis* sp. n., holotype, female. (7) Sternal region. (8) Anal region. (9) Ventral setae. (10) Tritosternum. (11) Ventral view of gnathosoma. (12) Epistome. (13) Chelicera. Scale bars: 100 $\mu$m.

without sculptural pattern and with one pair of setae. Postdorsal setae similar to posterior setae in length and shape. Margins bearing three pairs of projections; the third (posterior) projections very long (370-400 $\mu$m), their margins with long tree-like setae, their bases with short tree-like setae.




FIGS 14-16

*Deraiophorus mirabilis* sp. n., holotype, female (14, 15) and male paratype (16). (14) Leg I. (15) Leg IV. (16) Sternal region. Scale bars: 100 $\mu$m.

*Ventral aspect of idiosoma* (Figs 7-8): Sternal setae short, smooth and needle-like. St1 placed near anterior margin of sternal shield, St2 near anterior margin of coxae II, St3 and St4 situated between posterior margin of coxae II and anterior margin of coxae III. One pair of lyriform fissures present near anterior margin of sternal shield. Sternal shield smooth, only a few small oval pits visible near basis of coxae III and IV. Ventral shield without ornamentation, most of ventral setae short and pilose (Fig. 9). Several longer setae on same level as anus; these similar in length and shape to the posterior setae. Adanal setae one third as long, postanal seta half as long as posterior setae, all similar in length and shape. Genital shield scutiform, without process, with small oval pits. Genital shield placed between anterior margin of sternal shield and coxae III. Tritosternum (Fig. 10) with narrow basis, tritosternal laciniae trifurcate and with serrate margins. Stigmata and peritreme not clearly visible.

*Gnathosoma* (Fig. 11): Corniculi, internal malae and hypostomal setae typical for the genus, h3 setae with smooth shafts. Tibia of palp bearing two serrated setae in

ventral part. Epistome typical for the genus (Fig. 12). Chelicera (Fig. 13) with the following well pronounced characters: nodus, sensillum proximale, sensillum ventrale, sensillum mobile, processus hyalinus; other details not clearly visible.

*Legs* (Figs14-15): Typical for the genus.

Description of male: Length of idiosoma 880 μm, width 710 μm, third (posterior) projections 350-360 μm (n=1). Shape of idiosoma, ornamentation and chaetotaxy of dorsal part as in female. Sternal setae: St1 short, smooth, needle-like and placed near anterior margin of sternal shield. St2 similar to St1, but twice as wide, placed near anterior margin of genital shield. Other sternal setae absent. Genital shield oval and placed between coxae III (Fig. 16). Ventral setae and ornamentation (except for position and number of sternal setae) similar to those of female.

Larva and nymphs unknown.

Etymology: The Latin name "mirabilis" refers to the very attractive appearance of this species.

Remarks: There are only two other species in this genus that bear very long posterior projections. The first one is *Deraiophorus rackae* Hirschmann & Zirngiebl-Nicol, 1969 which occurs in Brazil, the other one is *Deraiophorus manuleatus* Hirschmann & Hiramatsu, 1978 found in New Guinea. Both species, however, lack anterior horns.

***Deraiophorus schwendingeri*** sp. n. Figs 17-23

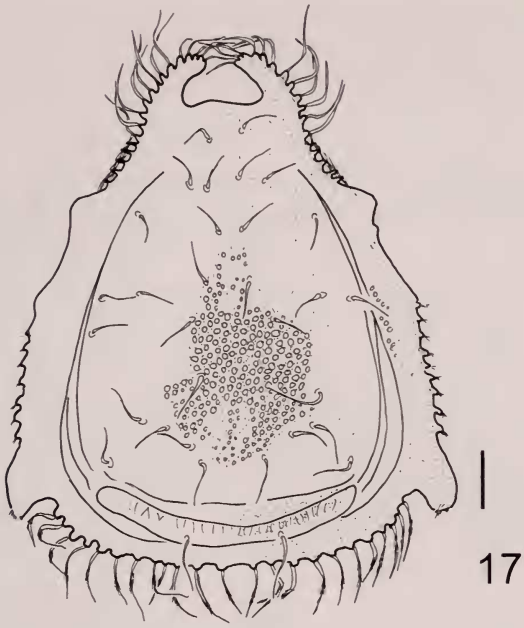
Material examined: Holotype, female, Thailand, Phuket Prov., Ko Siray, 7°53'06.8"N, 98°26'13.6"E, 30 m, old secondary forest, 28.09.2006, leg. P. Schwendinger. – Paratypes, four females, same data as for holotype.

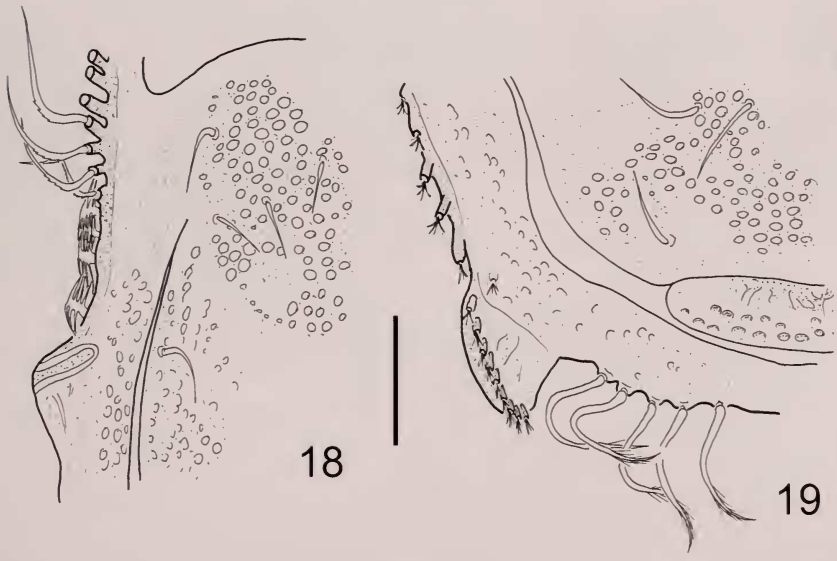
Diagnosis: Anterior horns well developed, bearing long and medially pilose setae. Dorsal shield with large alveolar ornamentation. Small oval pits present on genital shield and on sternal shield.

Description of females: Length of idiosoma 760-800 μm, width 460-520 μm (n=5). Shape subtriangular.

*Dorsal aspect of idiosoma* (Figs 17-19): Anterior horns well developed, with 12-13 long, medially pilose setae. Each seta placed on a wide basis (Fig. 18). Marginal setae tree-like, with longer or shorter branches (Figs 18-19). Posterior setae long and pilose (Fig. 19). Dorsal and marginal shields fused anteriorly, covered by small alveoli forming a pattern. Small oval pits absent on dorsal side of idiosoma. Dorsal setae half as long as setae on anterior horns, shafts of dorsal setae smooth. Postdorsal shield present, with ornamentation of alveoli and with one pair of setae. Postdorsal setae similar to posterior setae in length and shape. Lateral margins of idiosoma bearing three pairs of projections; the third (posterior) projections being bigger than the other two, distal margins with long tree-like setae, basally bearing short tree-like setae.

*Ventral aspect of idiosoma* (Figs 20-21): Sternal setae short, smooth and needle-like. St1 placed near anterior margin of sternal shield, St2 near coxae II, St3 near coxae III, St4 near basal margin of genital shield. One pair of lyriform fissures present near anterior margin of sternal shield. Sternal shield smooth, only a few small oval pits near bases of coxae III- IV. Ventral shield with web-like ornamentation of alveoli, most

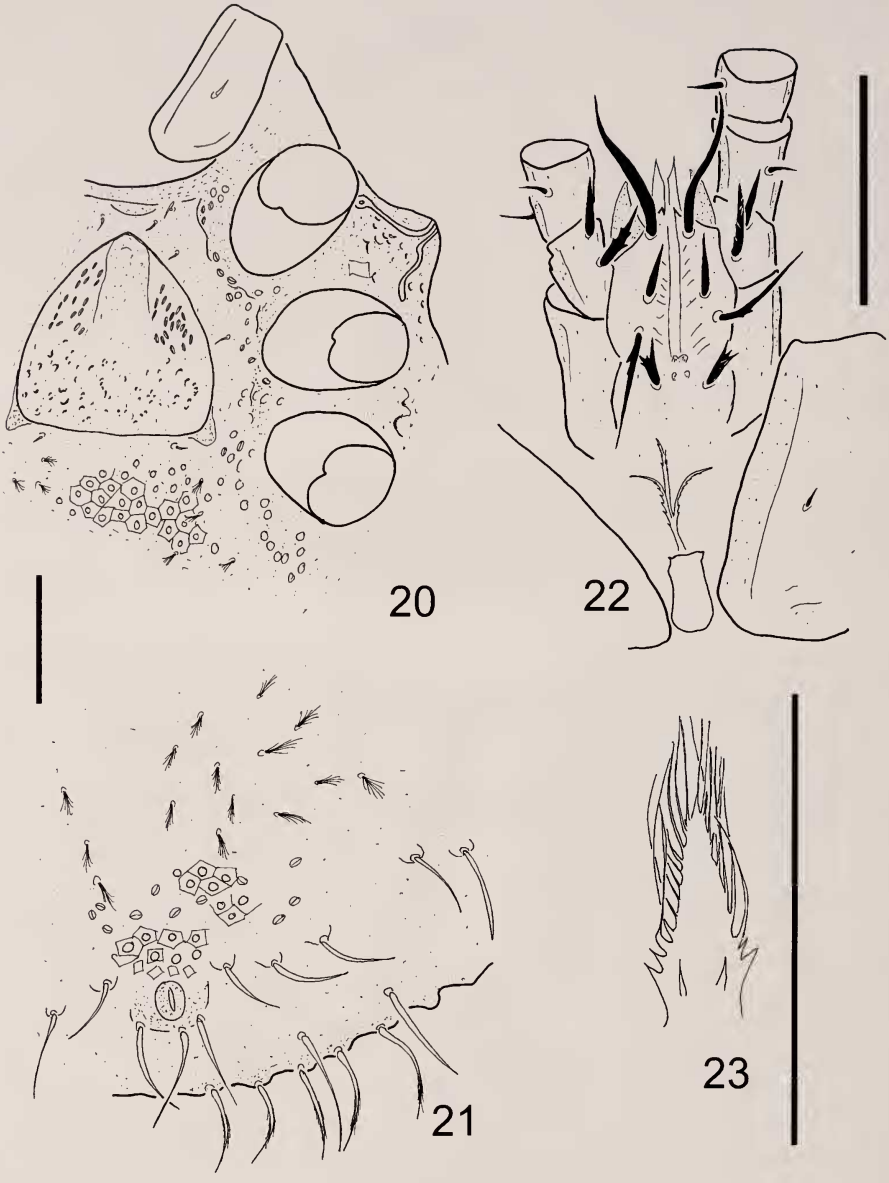



FIGS 17-19

*Deraiophorus schwendingeri* sp. n., holotype, female. (17) Body in dorsal view. (18) Marginal setae. (19) Posterior setae and third (posterior) projection. Scale bars: 100 $\mu$m.

ventral setae short and pilose. Several longer setae on same level as anus, these placed on small humps, their shape and length similar to the posterior setae. Shape and length of adanal and postanal setae similar to that of posterior setae. Genital shield scutiform, without process, with small oval pits in lateral regions, in basal region with fine




FIGS 20-23

*Deraiophorus schwendingeri* sp. n., holotype, female. (20) Sternal region. (21) Anal region. (22) Tritosternum and ventral view of gnathosoma. (23) Epistome. Scale bars: 100 $\mu$m.

maculate pattern. Genital shield placed between anterior margin of sternal shield and coxae IV. Tritosternum (Fig. 22) with narrow basis, tritosternal laciniae trifurcate, its branches serrate. Stigmata placed near coxae II, ventral part of peritreme V-shaped.

*Gnathosoma* (Fig. 22): Corniculi, internal malae and hypostomal setae typical for the genus, h3 setae with serrate shafts. Tibia of palp bearing two serrated setae in ventral part. Epistome typical for the genus (Fig. 23). Chelicerae not clearly visible.

*Legs*: Typical for the genus.

Larva, nymphs and male unknown.

ETYMOLOGY: I dedicate the new species to Dr Peter Schwendinger, the curator of the arthropod collections of the Muséum d'histoire naturelle, Geneva, who collected this *Deraiophorus* species in Thailand.

REMARKS: Only four previously known *Deraiophorus* species have a dorsal ornamentation formed by alveoli, well-developed anterior horns and three pairs of marginal projections. The first two species with these characters are *D. foraminosus* Hirschmann & Hiramatsu, 1990 and *D. javensis* Hiramatsu, 1980, but they have bigger first and second lateral projections than the new species. The third species (*D. prelongus* Hiramatsu & Hirschmann, 1978) bears short caudal and postdorsal setae. In the new species these setae are two times longer than the setae of *D. prelongus*. The fourth species (*D. pecinai* Hirschmann, 1990) differs from the new species by lacking the ornamentation of alveoli on the postdorsal shield.

***Deraiophorus thailandicus*** sp. n. Figs 24-29

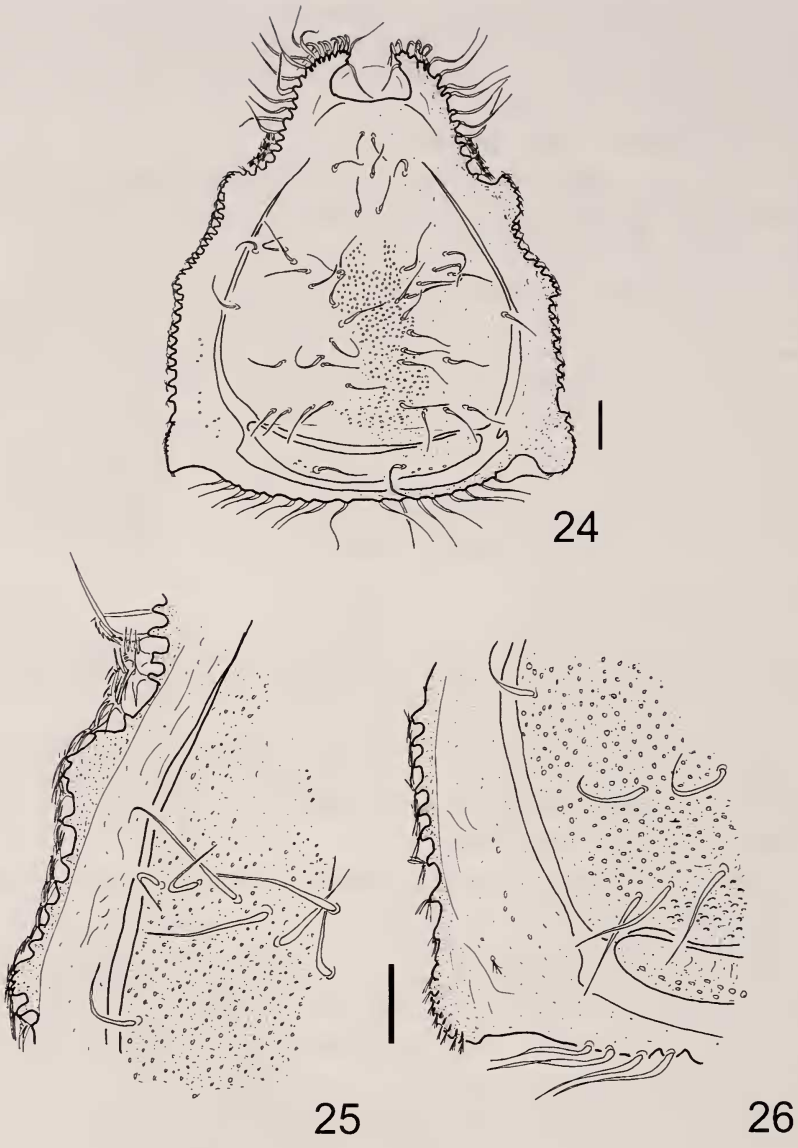
MATERIAL EXAMINED: Holotype, female, Thailand, Nakhon Ratchasima Prov., Khao Yai National Park, Khao Khieo, below Thai Air Force check point, 1150 m, 28.11.1985, leg. D. Burckhardt & I. Löbl. – Paratypes, four females, same data as for holotype.

DIAGNOSIS: Anterior horns well developed, bearing long and medially pilose setae. Margins of idiosoma with three pairs of projections and bearing tree-like setae. Dorsal shield with ornamentation formed by alveoli. Small oval pits present on genital shield and on sternal and ventral shields.

DESCRIPTION OF FEMALE: Length of idiosoma 820-860 μm, width 560-580 μm (n=5). Shape subtriangular.

*Dorsal aspect of idiosoma* (Figs 24-26): Anterior horns well developed, with 16 long, medially pilose setae. Each seta placed on a wide basis (Fig. 25). Marginal setae tree-like, with longer or shorter branches (Figs 25-26). Posterior setae long and pilose (Fig. 28). Dorsal and marginal shields fused anteriorly, covered by alveoli forming pattern. Dorsal setae shorter than setae of anterior horns, their shafts smooth. Postdorsal shield present, with ornamentation of alveoli and with one pair of setae. Postdorsal setae similar to posterior setae in length and shape. Margins of idiosoma bearing three pairs of projections; the third (posterior) projections being bigger than the other two. Tree-like setae present on margins and on basis of third (posterior) projections.

*Ventral aspect of idiosoma* (Figs 27-28): Sternal setae short, smooth and needle-like. St1 placed near anterior margin of genital shield, St2 near central region of coxae II, St3 and St4 near basal margin of genital shield. Lyriform fissures not clearly visible. Sternal shield with ornamentation of alveoli, small oval pits only present near basis of coxae IV. Ventral shield covered by ornamentation formed by alveoli, most ventral setae short and pilose. Several short serrate setae in area anterior to anus. Several




FIGS 24-26

*Deraiophorus thailandicus* sp. n., holotype, female. (24) Body in dorsal view. (25) Marginal and dorsal setae. (26) Posterior setae and third (posterior) projection. Scale bars: 100 $\mu$m.

longer setae present on same level as anus, their shape and length similar to that of posterior setae. Shape and length of adanal and postanal as that of posterior setae. Genital shield scutiform, without process, with small oval pits in lateral regions. Genital shield placed between anterior margin of sternal shield and coxae IV.

FIGS 27-29

*Deraiophorus thailandicus* sp. n., holotype, female. (27) Sternal region. (28) Anal region. (29) Tritosternum and ventral view of gnathosoma. Scale bars: 100 $\mu$m.

Tritosternum (Fig. 29) with narrow basis, tritosternal laciniae trifurcate, their branches serrate. Stigmata and peritreme not clearly visible.

*Gnathosoma* (Fig. 29): Corniculi, internal malae and hypostomal setae typical for the genus, h3 setae with serrate shafts. Tibia of palp bearing two serrate setae in the ventral part. Epistome and chelicerae not clearly visible.

*Legs*: Typical for the genus.

Larva, nymphs and male unknown.

ETYMOLOGY: The name of the new species refers to its country of origin.

REMARKS: This kind of ornamentation, formed by alveoli and present on the dorsal and ventral side of the idiosoma, is rarely seen in *Deraiophorus* species bearing anterior horns and three pairs of marginal projections. Only two previously described species show these characters (*D. luzonensis* Hirschmann & Hiramatsu, 1990 and *D. hexacornutus* Hirschmann, 1973). *D. luzonensis* has no ornamentation on the sternal and ventral shields, whereas the sternal and ventral shields of the new species do have an ornamentation of alveoli. The genital shield of the female of *D. hexacornutus* is narrow and covered by only small oval pits, the genital shield of the female of the new species is wide and more intensively ornamented with such pits.

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